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MORTALITY OF PERSONS WITH IMPAIRED HEARTS

Persons with mitral regurgitation, popularly known as leaky heart, suffer a mortality far above the normal. In a group of white males with this impairment, the deathrate was over twice that of normal persons and among white females it was nearly three times as high. Among colored persons the male deathrate was three and a half, and the female three times the normal.

These facts were brought out by studies of the mortality of persons with certain heart impairments, recently made by the Statistical Bureau of the Metropolitan Life Insurance Company. The present article is concerned only with mitral regurgitation, the most common organic heart impairment. It should be realized, however, that there are some heart conditions not subject to studies of this kind, because the prospective length of life of the persons suffering from them is so short that they are not accepted for insurance.

For many years, insurance companies were unwilling to write policies on persons with any kind of heart murmur; but toward the end of the nineteenth century, they began cautiously to admit the best risks of this type at advanced premium rates. In the intervening years, their practice has become more liberal and the very best of these risks occasionally receive insurance with the least substandard ratings. It is significant, however, that this group of insured lives has not shown as much improvement in mortality as has taken place in the population, as a whole, and in the general run of insured persons.

There were available for study the records of 26,079 persons with mitral regurgitation. Their deathrates, in the period 1908 to 1928, have been compared with those of "standard" risks who are free from serious impairments and from excessive occupation hazards. The standard used is the American Men Mortality Table, which includes the combined mortality experience of all the large companies of the United States and Canada on white males between the years 1900 and

1915. The mortality of males and females has been studied separately, and since 1918 by color. It should be observed that the persons for whom we give data were very carefully selected. Those who showed signs of early breakdown or whose outlook was not good because of other serious impairments or hazardous or strenuous occupations, were either given insurance at higher rates than the average risk with cardiac disease, or were not accepted.

We have already shown how excessive is the deathrate among risks with mitral regurgitation. We give below several other important observations on white males with this impairment, insured since 1918, who constitute a large part of the whole group and for whom the necessary details were available.

The ratio of mortality of white males with mitral regurgitation to the normal mortality was greater at the younger ages than at the older ages. Thus, at ages under forty, actual deaths were 230.2 per cent. of the expected, but over that age they were only 188.5.

Mitral regurgitation is frequently accompanied by an increase in the size of the heart, due to the extra work placed on the organ by its defect. If the hypertrophy is not excessive, the effect on longevity is small; but, as a rule, persons with cardiac hypertrophy do not live as long as those in whom the heart size remains normal. This fact is brought out by the ratios of actual to expected deaths in the two groups, namely, 214.2 per cent. for cases without hypertrophy and 299.7 per cent. for those with it. It is significant that the mortality of persons under 40 with hypertrophy is 50 per cent. in excess of those with normal size hearts, but that after that age, the difference between the groups is nominal. A fact not brought out by the present study, but by others of the same nature, is that the mortality increases with an increasing degree of hypertrophy.

The extent to which these persons actually die of heart disease is most striking. Among white males, 39 per cent. of the deaths was due directly to the organic heart condition, and in 9 per cent. more, the heart condition was an important factor. There were in addition a few deaths reported from acute cardiac diseases. These were probably terminal conditions only, or acute manifestations of the chronic disease. The percentage of deaths from heart disease to all deaths in this group is nearly four times that in an ordinary one, but if we make the comparison on the basis of deathrates, their mortality from heart disease is nearly ten times the normal.

Degenerative diseases of the kidneys, the brain, and the arteries, often associated with organic heart disease, accounted for 11 per cent.

of the deaths. Other diseases frequently reported and from which the deathrates are undoubtedly higher than normal, are influenza, pneumonia and tuberculosis.

Mitral regurgitation is due, in many cases, to the principal childhood diseases, to rheumatic fever and focal infections. The high mortality of the group indicates the severity of lesions which arise from these conditions. Even the best medical care is often unable to obviate serious consequences to the health of those who have had such childhood diseases. This study serves to emphasize, then, an aspect of preventive medicine which is often forgotten. For, prevention not only effects an immediate saving in lives, but also reduces the deathrate from the serious diseases and conditions which complicate or follow the infectious diseases. At the same time, it cuts down the number of persons who are permanently handicapped by chronic organic conditions, such as mitral regurgitation.

DEATHRATE AMONG THE INDUSTRIAL POPULATIONS OF AMERICAN STATES AND CANADIAN PROVINCES

In the January STATISTICAL BULLETIN there appeared a tabulation showing the deathrates, in 1929, for all causes of death combined and for each important cause, among the entire group of 19,000,000 Metropolitan Industrial policyholders. We are now able to supplement this by similar statistics for the insured in individual states and in the Canadian provinces. These statistics give the very earliest indication of health conditions in 1929 among the urban populations of the two countries. Furthermore, they constitute the *only* comparative index of the relative mortality among the urban *industrial* populations of the several states.* Similar statistics in past years have been found to be useful to health officers, physicians and the press. The accompanying comments relate to the deathrates from all causes of death combined among white policyholders. In forthcoming issues of the BULLETIN, similar data will be presented for some of the more important individual causes.

The lowest deathrate in the urban industrial populations of any of the broad regions of the two countries was that for the Western Provinces of Canada (5.7 per 1,000). Furthermore, each individual province in this group registered a remarkably favorable mortality rate. This, however, is to be expected in a region where the popula-

*It should be remembered that the Industrial policyholders reside, almost entirely, in the cities. Important, therefore, as these figures are, they are not to be taken as indicating definite health conditions in the *entire* populations of the various states, and this applies especially to those states which have large rural populations.

tion is, relatively, a new and prosperous one. The mortality in the Province of Manitoba (5.3 per 1,000) was lower than in any other Canadian province or American state, although closely followed by British Columbia and Minnesota, in each of which a deathrate of 5.4 prevailed.

The deathrates in Eastern Canada are in marked contrast. Here, for the combined populations of Nova Scotia, New Brunswick, Ontario and Quebec, a rate of 9.6 per 1,000 was recorded. In Quebec, the figure was 11.3 per 1,000, the third highest in either country; in New Brunswick, it was 10.6 and in Nova Scotia (where the mortality from tuberculosis runs very high), it was 9.9. Ontario, on the other hand, with a deathrate of 7.2, shows a much better record than most American states.

Next to the Western Provinces of Canada, the three Pacific Coast states had the lowest regional record, 6.5 per 1,000. Washington made the best showing (5.6), a figure that was excelled in only one American commonwealth, Minnesota. California, despite the fact that many incurably sick persons go there in search of relief, enjoyed the very low deathrate of 6.8.

The Mountain States rank second to the Pacific Coast, with a deathrate of 7.1 per 1,000, as compared with an average of 8.2 for all Industrial policyholders in the United States. The best health record in this part of the country (6.3 per 1,000) was made by Utah, where the Metropolitan had 68,000 white policyholders in 1929. Montana, with a mortality rate of 6.4, followed Utah very closely. The remaining regions showing deathrates below the average for the United States were the West North Central and the New England states (7.4 per 1,000) and the East North Central (7.7). In the West North Central region, Minnesota registered the lowest deathrate in the country (5.4 per 1,000) among its 143,000 white Industrial policyholders. The excellent figure of 6.0 was recorded in Nebraska. In New England, every state except Rhode Island had a better than average deathrate. The 79,000 Industrial policyholders in Vermont cities made the best record in this part of the United States. In the East North Central group, Wisconsin's mortality figure (6.5 per 1,000) was the best. The deathrate in Michigan was slightly, and that in Indiana considerably, above the average for all Industrial policyholders in the United States.

The highest broad regional deathrate was recorded in the East South Central region (10.2 per 1,000). The mortality in all four of the states in this group was far above the average. The South

Deathrates per 100,000 Persons Exposed. All Causes. All Ages. By Geographic Division, State and Province. Metropolitan Life Insurance Company, Industrial Department, 1929

Geographic Division	Deathrates per 100,000	
	White	Colored
Total Company	836.7[1]	1,562.2[2]
United States	824.7[3]	1,556.8[4]
New England	737.3	1,213.5
Maine	760.4	*
New Hampshire	715.5	*
Vermont	691.5	*
Massachusetts	721.0	1,159.0
Rhode Island	848.3	1,140.9
Connecticut	724.7	1,318.3
Middle Atlantic	872.1	1,295.0
New York	813.0	1,214.7
New Jersey	884.8	1,306.2
Pennsylvania	993.4	1,385.6
East North Central	766.1	1,484.1
Ohio	821.0	1,660.6
Indiana	888.0	1,353.9
Illinois	689.5	1,357.7
Michigan	841.3	1,737.8
Wisconsin	653.2	1,524.7
West North Central	740.4	1,424.3
Minnesota	543.4	1,179.4
Iowa	784.4	1,296.7
Missouri	790.2	1,467.8
Nebraska	596.7	1,216.5
Kansas	801.9	1,423.2
South Atlantic	1,004.3	2,014.6
Delaware	894.6	1,285.8
Maryland	1,011.3	1,674.0
Dist. of Columbia	790.8	1,617.1
Virginia	1,004.5	1,895.6
North Carolina	1,182.0	2,428.6
South Carolina	1,374.4	3,033.4
Georgia	937.2	2,111.1
South Atlantic (*Cont.*)		
Florida	1,069.9	2,086.8
West Virginia	903.2	1,487.0
East South Central	1,020.6	1,906.7
Kentucky	1,007.4	1,782.0
Tennessee	974.8	1,842.1
Alabama	1,126.2	1,999.4
Mississippi	1,098.1	*
West South Central	970.1	1,917.6
Arkansas	929.3	2,021.3
Louisiana	967.0	1,836.2
Oklahoma	1,021.1	2,135.7
Mountain	714.4	1,217.9
Montana	643.5	*
Idaho	1,036.3	*
Colorado	794.8	1,057.3
Utah	628.2	*
Pacific	653.0	906.7
Washington	562.7	1,233.3
Oregon	619.1	*
California	677.3	875.0
Canada	917.9[5]	1,052.3[5]
Eastern Provinces	961.4	*
Nova Scotia	989.9	*
New Brunswick	1,056.1	*
Quebec	1,127.3	*
Ontario	724.1	*
Western Provinces	565.5	*
Manitoba	533.0	*
Saskatchewan	592.0	*
Alberta	649.5	*
British Columbia	544.2	*

*Not calculated on account of small number of colored policyholders.
[1]Includes 825 deaths of white policyholders outside United States and Canada.
[2]Includes 170 deaths of colored policyholders outside United States and Canada.
[3]Includes 382 deaths of white policyholders in states not tabulated below.
[4]Includes 91 deaths of colored policyholders in states not tabulated below.
[5]Includes 42 deaths of white policyholders and 3 deaths of colored policyholders in provinces not tabulated below.

Atlantic region followed closely with a rate of 10.0. Here South Carolina with 13.7 per 1,000 and North Carolina, 11.8, contributed the most unfavorable health records of 1929 in either the United States or Canada. In the District of Columbia alone, of this group, was the deathrate below the average for the country.

The standing of the Middle Atlantic states is also unfavorable, but this is due entirely to high mortality in Pennsylvania and New Jersey. The figure for New York (8.1) is a little better than the average for all American policyholders combined.

All of the deathrates quoted above relate to white policyholders only; but equally informative data are available for the colored insured who numbered approximately 2,400,000 in 1929. Their deathrate (15.6 per 1,000) was nearly double that for the whites (8.4). The lowest deathrate for the colored* (9.1 per 1,000) prevailed on the Pacific Coast, where the Company had 71,000 negro policyholders in 1929. Other below-average broad regional deathrates were those for New England (12.1), the Middle Atlantic states (13.0), the West North Central states (14.2) and the East North Central region (14.8). The maximum (20.1) was registered in the South Atlantic states, closely followed by the West South Central group (19.2) and the East South Central region (19.1). The highest deathrate for negro policyholders in any individual state (30.3) prevailed among 35,000 colored insured in South Carolina. Above-average figures are also in evidence for North Carolina, Georgia, Florida, Arkansas, Alabama, Virginia, Tennessee, Louisiana, Kentucky, Michigan, Maryland, Ohio and the District of Columbia.

The table on page 5 presents the deathrate for white and colored policyholders, respectively, by geographic division, state and province.

THE EXPECTATION OF LIFE IN 1928

We present herewith a table showing the expectation of life in 1928 for total persons in the United States Registration States (as of 1920). The figures for 1926 and 1927 are also shown, for comparison.

The year 1928 exhibits no particularly striking characteristics. Its record is a little less favorable than that of 1927; this need not cause us any particular concern, for it was realized at the time, that the year 1927 was an exceptionally good health year, whose record we might not expect to equal or to surpass for some time to come. As events have turned, the table for 1928 closely resembles that for 1926, the year immediately preceding the exceptionally good year 1927; though

*Areas in which relatively few colored lives are insured not considered.

at the very beginning of the table, *i.e.*, at birth, there is a gain of one-half year. As we have already had occasion to remark, conditions of public health have in past decades improved to a point beyond which additional gains will have to be wrested with increasing effort and diminishing effect, so far as the resulting expectation of life is concerned.

There is, however, another matter for the discussion of which the present publication of the 1928 life table furnishes the occasion. By the time this BULLETIN reaches our readers, a new census of the United States will be actually in progress. To those who have followed vital statistics, this is an event of prime interest. The Constitution of the United States provides for a Federal Census to be held once in every ten years. During intercensal years, in all computations involving the number and age distribution of the American population, we are forced to rely upon *estimates* instead of observed figures. For the first few years after a census, this is not a serious inconvenience.

Expectation of Life for Specified Ages in 1926, 1927 and 1928, United States Registration States as of 1920, Total Persons*

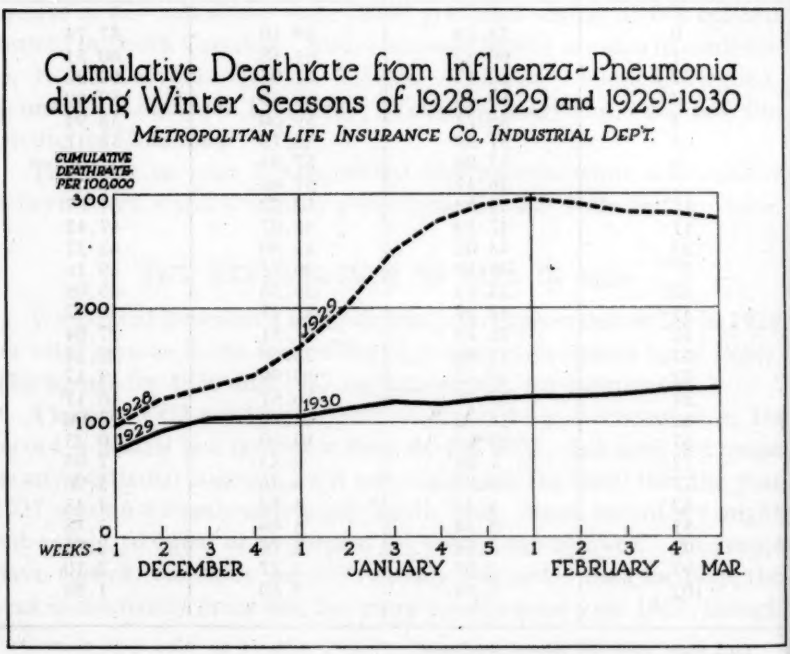
AGE	1928	1927	1926
0	58.18	59.10	57.74
1	60.52	61.48	60.51
2	60.17	61.07	60.32
3	59.49	60.38	59.69
4	58.71	59.60	58.94
5	57.88	58.78	58.12
6	57.04	57.93	57.28
7	56.17	57.06	56.42
12	51.63	52.52	51.87
17	47.19	48.07	47.42
22	43.01	43.86	43.27
27	38.89	39.71	39.16
32	34.74	35.56	35.03
37	30.67	31.47	30.97
42	26.74	27.51	27.04
47	22.96	23.68	23.24
52	19.32	19.99	19.57
57	15.95	16.57	16.17
62	12.82	13.39	13.00
67	10.06	10.60	10.23
72	7.82	8.33	7.95
77	5.93	6.36	5.96
82	4.44	4.82	4.45
87	3.34	3.66	3.38
92	2.51	2.76	2.55
97	2.07	2.17	2.10
102	1.65	1.69	1.68

*Both sexes, white and colored population.

But as we approach a new census we are—as at present—eight or nine years away from the basis of our estimates. All mortality figures, and the life tables built on them, labor under this disadvantage. It is not likely that we have been far out in our estimates of the number of the population. More doubt may be felt regarding estimates of the age distribution, for this is bound to change, with a relative increase in the proportion of older persons, as time goes on. We shall, therefore, look forward with much curiosity to the results of the coming census. It may be that, after the figures become available, we shall find it expedient to lay before our readers a revised version of the life table for 1928, differing somewhat from the one now offered and the same figures may well cause us to revise certain conclusions which have been drawn recently as to the trend of mortality at the advanced ages.

LITTLE INFLUENZA MORTALITY THIS WINTER

The outstanding fact in the favorable health situation of the past winter is the absence of any serious outbreaks of influenza. At the end of the first week in March of this year, the cumulative deathrate for influenza and pneumonia for a period of fourteen weeks beginning in December, 1929, was 53 per cent. below the rate for the corresponding period of the preceding winter. The year 1930 has had a good



start toward another low record for the acute respiratory diseases. Following the present tendency of mortality, there will probably be a continuation of the upward trend of the deathrate to a maximum point, for 1930, at about the end of March. From that point onward, the rate should decline until the advent of the 1930-1931 winter season.

The experience for fourteen weeks, ending with the first week of March, 1930, is shown in the chart on page 8.

HEALTH RECORD FOR FEBRUARY, 1930

The exceptionally favorable health conditions which prevailed in January of this year have continued during February. The February deathrate of 9.6 per 1,000, among the 19,000,000 Industrial policyholders of the Metropolitan Life Insurance Company is, with a single exception (9.5 in 1928), lower than ever before recorded for this group during the second month of the year. The cumulative deathrate for the January-February period was only 9.5 per 1,000, marking a decline of 23.6 per cent. as compared with the like period of 1929. Among policyholders living west of the Rocky Mountains, the year-to-date rate at the end of February was 7.3 per 1,000, against 7.6 in 1929; while for the rest of the United States the 1930 cumulative figure (9.7 per 1,000) marks a drop from 12.8 during January-February last year. In Canada, the cumulative mortality rate dropped from 12.1 in 1929 to 9.4 in 1930.

Every disease, except scarlet fever, listed in the table on page 11, had a lower deathrate during the January-February period than in the like part of last year; and in nearly every instance the gain was large. Considerable improvement was to be expected, of course, as last year's influenza outbreak caused inordinately high mortality, not only from influenza and pneumonia, but from chronic diseases in cases where influenza hastened death. Comparison with two years ago, nevertheless, also shows lower deathrates this year than were then registered for most of these diseases.

The cumulative cancer deathrate this year (73.8 per 100,000) is noteworthy. It may be compared with 77.7 in 1929 and 76.0 in 1928. No false optimism should arise from this small drop. It may have no significance whatever. On the other hand, those who have been watching year after year for *any* favorable item in connection with the rising death-toll from cancer will await the figures for the next few months with keen interest. For, this is the first time in a long series of years when the cancer mortality figures have afforded any basis whatever for the hope of a break in the persistently rising deathrate.

The only bad spot in the mortality record of early 1930 is automobile fatalities. At the end of February, the deathrate was 18.4 per 100,000. The winter months are the very ones when we expect the lowest mortality of the entire year from this cause of death. How utterly bad is the current situation is shown by the fact that the winter automobile deathrate this year has run almost as high as that for the peak months only two or three years ago.

The general deathrate for the large cities of the United States, in February, was 14.3 per 1,000. This is higher than the rate for January (13.4), but lower than the figure for February, 1929 (15.6). There was increased prevalence, in February, as compared with January, of scarlet fever, influenza and measles together with fewer cases of typhoid fever, diphtheria, smallpox and poliomyelitis. Comparison with February, 1929, shows more cases this year of scarlet fever, smallpox, typhoid fever, measles and poliomyelitis, with reduced prevalence of diphtheria and influenza.

Reports from 35 states show that measles was much more prevalent in February (33,391 cases) than in January (21,311). The more noteworthy increases were in New Jersey, South Dakota, Nebraska, Florida, Alabama, Oklahoma, Wyoming, Colorado, Washington and California. Scarlet fever cases rose, in 46 states, from 19,107 in January to 20,643 in February. Ohio, Illinois, South Dakota and Oregon account for a large part of the increase. Smallpox cases decreased very slightly in February, according to reports from 45 states, although there was increased prevalence of this disease in South Dakota, Kansas and Texas.

The following are among the more noteworthy public health activities of the month. Provision has been made by the COMMONWEALTH FUND of New York for a five-year research into the cause and cure of trachoma. Washington University, St. Louis, will undertake this study. The UNIVERSITY OF CALIFORNIA has received an anonymous gift of $100,000 for the support of research into cancer and allied subjects by the University Medical School and the HOOPER FOUNDATION FOR MEDICAL RESEARCH. A three-year research program seeking to discover factors which relate to pyorrhea has been started under the direction of the COLUMBIA UNIVERSITY SCHOOL OF DENTAL AND ORAL SURGERY. The State of Tennessee was selected as one of two states in which the COMMONWEALTH FUND will engage in certain cooperative health projects, more particularly in the field of rural health and in developing a more extensive program in health education and child hygiene.

The following table shows the mortality among Industrial policyholders for February, 1930, January, 1930, and February, 1929, together with the cumulative rate for the first two months of each year.

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates* per 100,000 for Principal Causes, Premium-Paying Business in Industrial Department (Annual Basis)

MONTHS OF FEBRUARY, 1930; JANUARY, 1930, AND OF FEBRUARY, 1929

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED*				
	Feb. 1930	Jan. 1930	Feb. 1929†	Cumulative Jan.-Feb.	
				1930	1929†
TOTAL—ALL CAUSES	963.8	940.1	1,135.6	951.3	1,245.2
Typhoid fever	1.3	1.1	.8	1.2	1.4
Measles	3.3	2.1	4.2	2.7	3.6
Scarlet fever	3.9	3.8	3.4	3.8	3.8
Whooping cough	5.5	4.5	7.2	5.0	8.3
Diphtheria	9.0	10.9	9.8	10.0	11.7
Influenza	27.3	26.2	104.4	26.7	153.3
Tuberculosis (All forms)	82.3	79.7	94.0	80.9	94.0
Tuberculosis of resp'y system	71.9	69.8	84.5	70.8	84.6
Cancer	73.1	74.4	74.3	73.8	77.7
Diabetes mellitus	20.2	22.3	22.2	21.3	25.3
Cerebral hemorrhage	68.2	59.3	‡66.0	63.5	‡67.2
Organic diseases of heart	169.0	161.3	181.0	165.0	192.2
Pneumonia (All forms)	117.2	108.8	160.4	112.8	187.8
Other respiratory diseases	11.8	13.2	22.0	12.6	24.2
Diarrhea and enteritis	11.1	11.6	13.7	11.3	14.0
Bright's disease (Chronic nephritis)	71.0	73.7	79.5	72.4	82.7
Puerperal state	14.4	12.0	14.7	13.1	14.8
Suicides	7.5	8.6	8.0	8.1	8.4
Homicides	5.5	7.0	6.8	6.3	6.8
Other external causes (excluding suicides and homicides)	58.7	61.3	55.5	60.1	58.9
Traumatism by automobiles	16.4	20.2	12.6	18.4	15.3
All other causes	203.5	198.4	207.6	200.8	209.1

*All figures in this table include infants insured under one year of age.
†All 1929 deathrates subject to slight correction, as they are based on provisional estimate of lives exposed to risk.
‡Rate not comparable with that for 1930.

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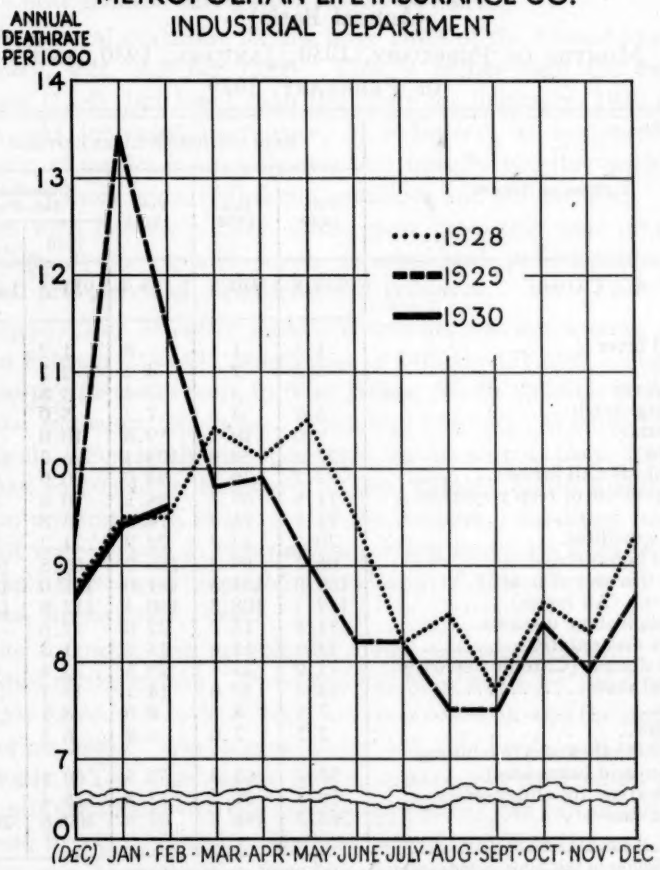
DEATHRATES
FROM ALL CAUSES

METROPOLITAN LIFE INSURANCE CO.
INDUSTRIAL DEPARTMENT



1928*	9.5	9.5	10.4	10.1	10.5	9.5	8.2	8.5	7.7	8.6	8.3	9.3
1929	13.4	11.4	9.8	9.9	9.0	8.2	8.2	7.5	7.5	8.4	7.9	8.7
1930	9.4	9.6										

* Rates for 1928 are final.

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